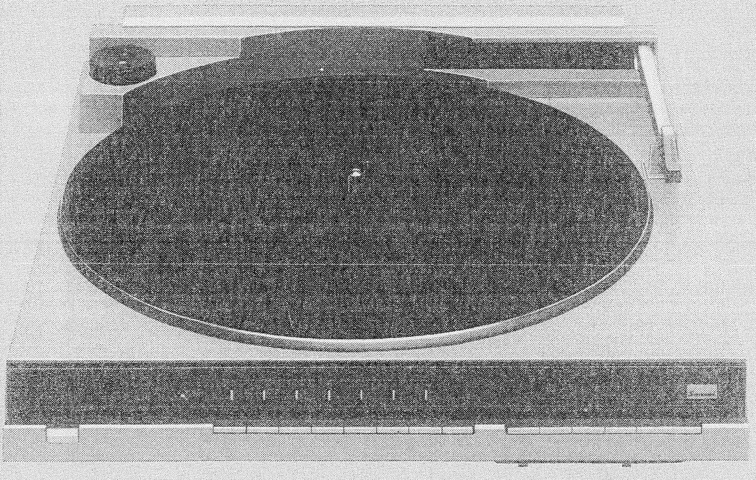
30

SERVICE MANUAL

FULLY AUTOMATIC QUARTZ/DD TURNTABLE
with COMPUEDIT.

SANSUI P-M7



Sansui

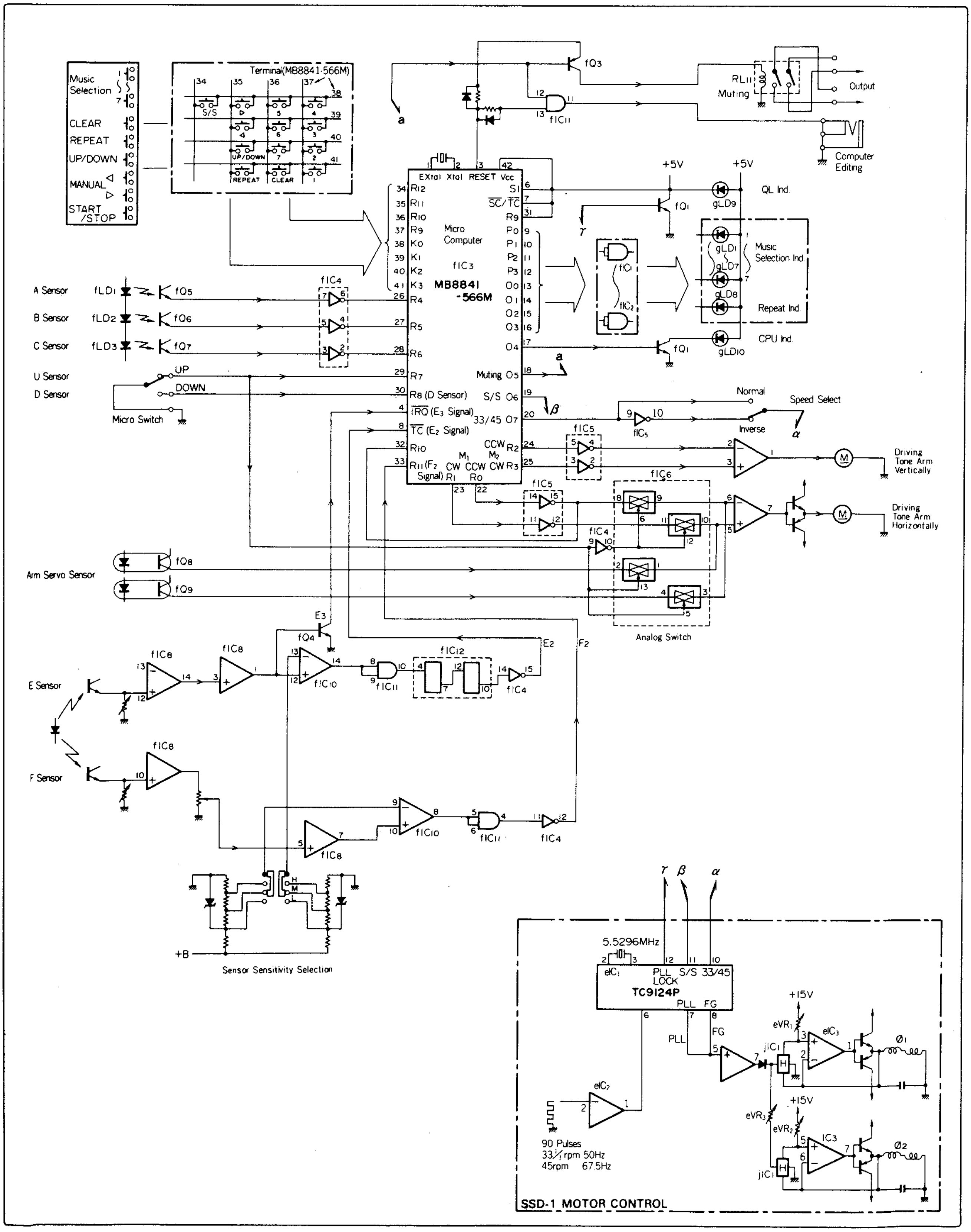
SANSUI ELECTRIC CO., LTD.

● SPECIFICATIONS

Type	Direct-drive turntable
Rated speeds	33-1/3, 45 rpm
Platter	Aluminum alloy diecast, 306 mm (12-1/6") diameter, 0.6 kg (1.3 lbs.) weight
Motor	Coreless DC/quartz servo
Wow/flutter	0.028 % (WRMS)
Signal-to-noise ratio	Better than 72 dB (DIN-B) Better than 60 dB (IEC-B)
Tonearm	Static balance, low-mass tonearm
Effective tonearm length	142 mm (5-5/8")
Cartridge	Dual Magnet type (SV-S303)
Output voltage	2.4 mV (1,000 Hz, 35.4 mm/sec)
Correct load impedance	47 kohms
Frequency response	10 ~ 22,000 Hz
Stylus	0.6 mil diamond stylus (SN-S303) replacement stylus
Dimensions	345 mm (13-5/8") W 99 mm (3-15/16") H 360 mm (14-3/16") D
Weight	5.8 kg (12.8 lbs.) net 6.6 kg (14.6 lbs.) packed
Power consumption	20 W

* Design and specifications subject to change without notice for improvements.

1. BLOCK DIAGRAM


Music Selection
CLEAR
REPEAT
UP/DOWN
MANUAL
START /STOP
Terminal(MB8841-566M)
S/S
REPEAT
CLEAR
UP/DOWN
EXtal Xtal RESET Vcc
Micro Computer
fIC3
MB8841 -566M
R12
R11
R10
R9
K0
K1
K2
K3
R4
R5
R6
R7
R8 (D Sensor)
IRQ (E3 Signal)
TC (E2 Signal)
R10
R11 (F2 Signal)
S1
SC/TC
R9
P0
P1
P2
P3
O0
O1
O2
O3
O4
Muting O5
S/S O6
33/45 O7
CCW R2
CW R3
M1 CW CCW R1
M2 CCW CW R0
A Sensor
B Sensor
C Sensor
U Sensor
D Sensor
fLD1
fLD2
fLD3
fQ5
fQ6
fQ7
fIC4
UP
DOWN
Micro Switch
fQ3
fIC11
RL11 Muting
Output
Computer Editing
+5V
+5V
QL Ind
fQ1
gLD9
fIC1
fIC2
gLD1
gLD7
gLD8
Music Selection Ind
Repeat Ind
CPU Ind
gLD10
a
γ
β
α
Normal
Inverse
Speed Select
fIC5
fIC6
Driving Tone Arm Vertically
Driving Tone Arm Horizontally
M
Analog Switch
Arm Servo Sensor
fQ8
fQ9
E3
fQ4
E2
F2
E Sensor
F Sensor
fIC8
fIC10
fIC11
fIC12
fIC4
Sensor Sensitivity Selection
+B
H
M
SSD-1 MOTOR CONTROL
5.5296MHz
eIC1
PLL LOCK
S/S
33/45
TC9124P
PLL
FG
eIC2
90 Pulses
33 1/3 rpm 50Hz
45rpm 67.5Hz
+15V
eVR1
eIC3
jIC1
Ø1
eVR3
eVR2
IC3
Ø2

2. OPERATIONS (See Fig. 2-1, Fig. 2-2, Fig. 2-3, Timing Chart and Block Diagram)

This fully-automatic player is of the linear tracking arm type, being provided with the following various functions:

1) automatic random music selection (seven musics);
2) automatic record disc size selection (30cm- 25cm- and 17cm-dia. discs);
3) automatic speed selection according to disc sizes (33 1/3 rpm and 45 rpm); and
4) computer editing in cooperation with a cassette deck (D-M7, SC-A33, D-570, and D-370).

2-1. Fully-automatic System Outline

This fully-automatic system player comprises 1) an automatic mechanism for driving a tone arm horizontally and vertically and 2) a control section for electrically control the automatic mechanism. The automatic mechanism assembly includes tone arm position sensors (A, B and C sensors), lifter position sensors (UP and DOWN sensors), an arm servo sensor, and an automatic disc size selection sensor (E sensor) and an automatic music selection sensor (F sensor) both mounted on the tip of the cartridge, in addition to the automatic mechanism, in order to detect the conditions of the tone arm. The control section includes a microcomputer MB 8841-566M and its peripheral circuits, in order to control 1) start/stop of a DD motor, 2) lead-in, lead-out, return, repeat, and up-and-down movement of the tone arm, and 3) automatic disc size selection, automatic music selection and automatic disc speed selection, in response to each output signal outputted from each sensor.

2-2. Automatic Mechanism Assembly Operation

1. In order to drive the automatic mechanism assembly, that is, to drive the tone arm horizontally for tone arm lead-in and lead-out operations, the revolution power of the micromotor (I) is transmitted through a belt (A), a warm gear (A) a drive gear, and a wire.
2. In order to drive the tone arm vertically for tone arm up-and-down movement, the revolution power of the micromotor (II) is transmitted through a belt (B), a warm gear (B), a lifter cam, and a lifter plate. The tone arm is driven vertically by moving up and down an arm holder weight mounted on an arm shaft.

2-3. Each Sensor Function For Fully-automatic Operation

A. A Sensor, B Sensor, and C Sensor

As shown in Fig. 2-2, the A, B, and C sensors detect tone arm positions required for automatic operation in such a way that three phototransistors (fQ5, fQ6 and fQ7) are turned on or off whenever a position guide moves between three phototransistors mounted on a sensor holder and covered by a slit plate and three LEDs (fLD1, fLD2 and fLD3).

The A sensor detects the lead-in positions of 30cm-, 25cm-, and 17cm-dia. discs and the lead-out position of a 17cm-dia. disc. Further, the B sensor and the C sensor detect in combination the disc size selection positions of 30cm-, 25cm-, and 17cm-dia. discs.

The B sensor detects the lead-out positions of 30cm- and 25cm-dia. discs and the positions required for operating the automatic music selection sensor (E2 sensor). That is to say, when the E2 sensor detects some lead-over groove while the B sensor is kept turned on (in this case the input port pin No. 27 of the microcomputer is at a L-voltage level), the tone arm stops and begins to come down.

The C sensor detects the disc size selection position of a 17cm-dia. disc in combination with the A sensor.

B. UP (U) Sensor and DOWN (D) Sensor

The U sensor and D sensor are made up of a lifter cam and two microswitches. The U sensor detects the up-position of the tone arm, and the D sensor detects the down-position of the tone arm. When the U sensor or D sensor detects the up- or down-position of the tone arm, the terminal of each microswitch is grounded.

C. E Sensor and F Sensor

Being mounted on the tip of the cartridge, the E sensor and F sensor supply three signals required for automatic disc size selection and automatic music selection to the microcomputer, after having divided the output signals into E2, E3 and F2 signals through an electric circuit.

- **E2 signal**

The E2 signal is a music number counting signal required for moving down the tone arm at a desired music position during the automatic music selection operation. When the E sensor detects a desired lead-over groove and the E2 signal is generated (changes to a H-voltage level) (in this case, the input port pin No. 33 of the microcomputer changes to a L-voltage level), the tone arm stops moving horizontally and next begins coming down.

Fig. 2-1

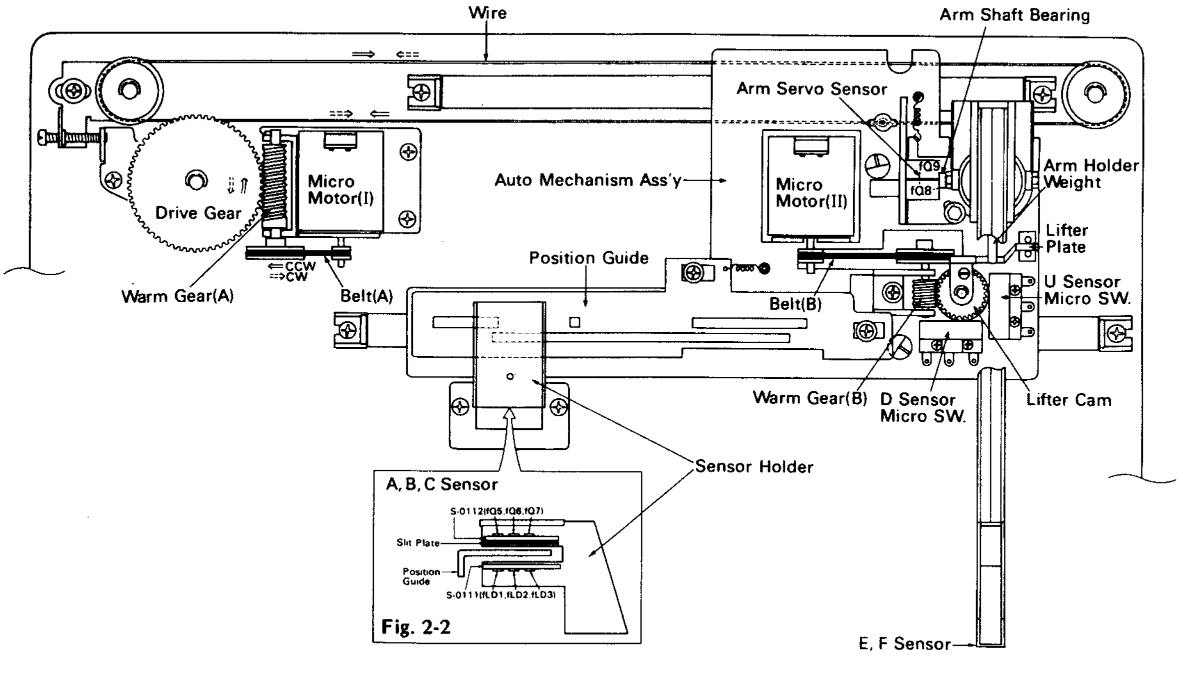


Fig. 2-2

- **E3 signal**

The E3 signal is a signal to detect the size and the presence or absence of a disc. In the tone arm lead-in operation, if the E3 signal is generated (changes from a L-voltage level to a H-voltage level) (in this case, the input port pin No. 4 of the microcomputer changes from a H-voltage level to a L-voltage level) when the A, B and C sensors are generating the respective signals as depicted within the zones Ⓐ, Ⓑ and Ⓒ shown in Fig. 2-3, the respective disc sizes of 30cm, 25cm and 17cm are selected.

After the E3 signal has been generated within the zones Ⓐ, Ⓑ and Ⓒ shown in Fig. 2-3, the tone arm stops moving horizontally and next comes down when the A sensor generates a L-voltage level signal (in this case, the input port pin No. 26 of the microcomputer changes to a H-voltage level) or a H-voltage level signal (in this case, the input port pin No. 26 of the microcomputer changes to a L-voltage level). Further, in the case where no E3 signal is generated within the zones Ⓐ, Ⓑ and Ⓒ, it is determined that there is no disc on the turntable.

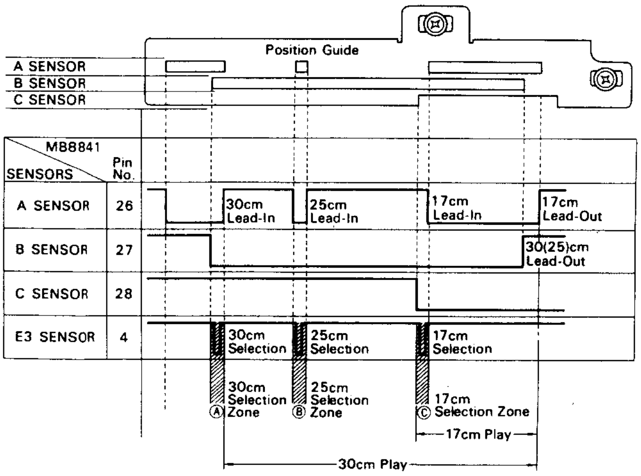
- **F2 signal**

Being different from the E2 and E3 signals, the F2 signal is a signal to indicate that the F sensor detects a lead-over groove when the stylus is tracing a music on a record disc.

The F2 signal serves as follows:

The lead-over groove of each music is detected in the automatic music selection operation. In the case where the last music on a record disc is selected, the instant the last lead-over groove (lead-out groove) is detected, the F2 signal changes from a L-voltage level to a H-voltage level (in this case the input port pin No. 33 of the microcomputer changes to a L-voltage level, so that the tone arm begins to return.

Fig. 2-3



D. Arm Servo Sensor

While the stylus is tracing a music on a disc, it is necessary for the stylus to be in contact with the disc at a right angle to the modulated glooves formed in the disc.

The arm servo sensor detects stylus inclination from a right angle to the modulated grooves, while the stylus moves on a disc. The inclination angle of the stylus is checked by a photo interaptor of the arm shaft bearling and two photo couplers (fQ8 and fQ9).

When the stylus inclines from the right angle, the photocoupler fQ8 or fQ9 is turned on according to the direction in which the stylus inclines, in order to activate the analog switch fIC6. In response to the signals from the photocouplers, the micromotor (II) rotates clockwise or counterclockwise in order to control the tone arm so as to be in contact with the modulated groove at a right angle.

E. Music Selection Sensitivity Switching Circuit

The automatic music selection operation must be accurate, without producing any positioning error when moving down the tone arm onto a disk, even if there are various dimensions in the width of lead-over groove.

This music selection sensitivity switching circuit can adjust the sensitivities of the E2 and F2 signals at the same time. As shown in the block diagram, the reference voltage applied to the comparator is adjusted to three stages by using a sensor sensitivity selector switch.

2-4. Microcomputer Output Peripheral Circuits

A. Micromotor control circuit

1. **Operation of tone arm horizontally driving micromotor (I)**

   The micromotor operates according to the tone arm up- or down-condition as follows:

   - **Where the tone arm is up;**

   When the pin No. 22 of the microcomputer becomes a L-voltage level, the micromotor (I) rotates counterclockwise to perform the lead-in operation. On the other hand, when the pin No. 23 of the microcomputer becomes a L-voltage level, the micromotor (I) rotates clockwise to perform the lead-out operation.

   - **Where the tone arm is down;**

   When the tone arm is in a down-state, the micromotor (I) rotates clockwise or counterclockwise in response to the output signal from the arm servo sensor (fQ8 and fQ9) to control the tone arm. Further, when the tone arm is down (in playing a music), since the pins No. 6 and No. 12 of the analog switch become a L-voltage level, the micromotor (I) does not rotate in response to the output signal from the pins No. 22 and No. 23 of the microcomputer.

2. **Operation of tone arm vertically driving micromotor (II)**

   When the pin No. 24 of the microcomputer becomes a L-voltage level, the micromotor (I) rotates counterclockwise to move the tone arm up or down. If the UP/DOWN key is depressed while the tone arm is moving up or down, the pin No. 25 of the microcomputer becomes a L-voltage level and, therefore, the micromotor (II) rotates clockwise to move the tone arm up or down.

B. 33 1/3 and 45 rpm Automatic Selection Circuit

According to the size of a disc, the revolution speed (33 1/3 or 45 rpm) of the turntable is automatically determined. When the E3 sensor detects a 30cm- (25cm-) dia. disc and a 17cm-dia. disc, the pin No. 20 of the microcomputer outputs a L-voltage level signal for the 30cm- (25cm-) dia. disc, and a H-voltage level signal for the 17cm-dia. disc. This output signal is inputted to the pin No. 10 of the DD motor control IC (TC 9142P : eIC1) via the speed selector switch (fS2). The turntable rotates at a speed of 33 1/3 rpm when the pin No. 10 of eIC1 is at a L-voltage level, and at a speed of 45 rpm when the pin No. 10 of eIC1 is at a H-voltage level.

The relationship between the speed selector switch, the record disc size, and the revolution speed is listed in the following table:

SPEED SELECTOR SW(fS2)		RECORD SIZE	
		30, 25cm-dia.	17cm-dia.
NORMAL	MB8841 Pin No. 20	L	H
	TC9142P Pin No. 10	L	H
	Speed (rpm)	33⅓	45
INVERSE	MB8841 Pin No. 20	L	H
	TC9142P Pin No. 10	H	L
	Speed (rpm)	45	33⅓

C. DD Motor Control Circuit

If the START/STOP switch is depressed when the turntable stops, a L-voltage level signal is outputted from the pin No. 19 of the microcomputer and is inputted to the pin No. 11 of the DD motor control IC (TC9142P). When a L-voltage level signal is inputted to the pin No. 11, the turntable rotates.

D. Music Selection Indicator Circuit

In the automatic music selection operation, the selected musics are stored into the microcomputer and displayed on the indicator.

In playing a music, the indicator light blinks as follows:

When the tone arm lead-in operation stops in a modulated groove, the indicator light begins to blink the instant a lead-over groove is detected (the F2 signal changes from a L-voltage level to a H-voltage level). Further, when the tone arm stops in a lead-over groove, the indicator light begins to blink the instant the micromotor (II) stops. Furthermore, in continuously playing musics, the indicator light begins to blink the instant a lead-over groove is detected (the F2 signal changes from a L-voltage level to a H-voltage level).

E. Computer Operation Indicator Circuit

The output signal from the pin No. 17 of the microcomputer turns on or off the fQ1, so that the indicator light blinks.

The indicator light blinks during the micromotor (I) or (II) is rotating. However, in case of such a miss-programming that only one music number not included in a record disc is selected or in case of no record disc, the indicator blinks much faster then its of normal operation after the return operation begins.

F. Muting Circuit

The muting circuit is a circuit to short-circuit the output signal from the player, where necessary.

The muting operation is performed by using the output signal from the pin No. 18 of the microcomputer.

1) In the automatic disc size selection and the UP/DOWN key depression, the muting is off when the tone arm is down, and is on when the tone arm is up.
2) In the automatic music selection operation (See Timing Chart), the muting is off the moment the tone arm moves down completely after the lead-in operation (the micromotor (II) stops rotating counterclockwise).
   Further, when the stylus moves down onto a modulated groove, the muting is off the moment the F sensor detects a lead-over groove (the F2 signal changes from a H-voltage level to a L-voltage level).

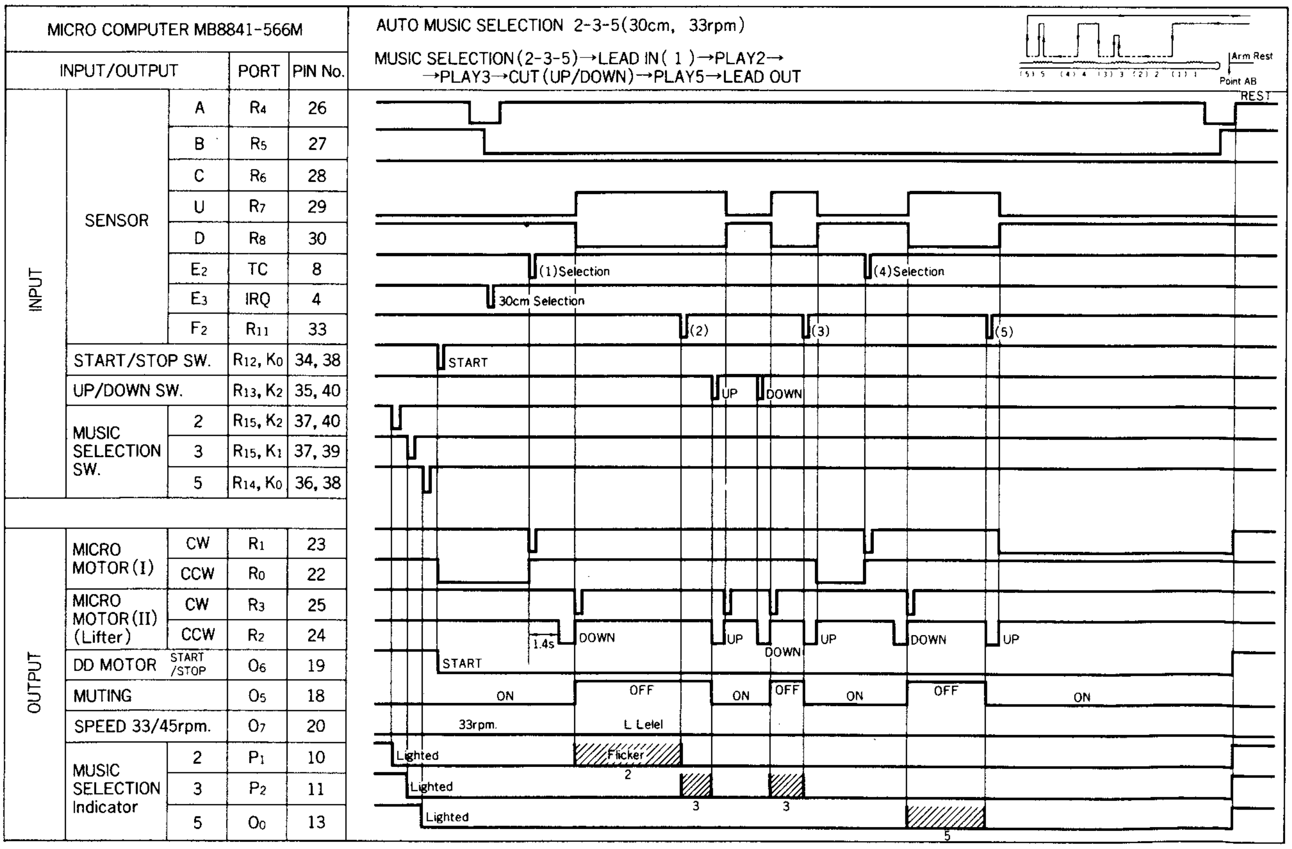
G. Computer Editing Circuit

In the same way as in the muting circuit of the player, the computer editing operation is performed by connecting the output signal from the pin No. 18 of the microcomputer to the pause circuit of a cassette tape recorder through a AND circuit. This circuit controls the recording on-or-off operation on the cassette tape recorder side in accordance with the automatic operation on the player side.

In other words, when the muting on the player side is on (the pin No. 18 of the microcomputer is at a L-voltage level), the pause on the cassette deck side is on; when the muting on the player side is off (the pin No. 18 is at a H-voltage level), the pause on the cassette deck side is off.

• MICRO COMPUTER

Timing chart 1 AUTO MUSIC SELECTION 2-3-5 (30cm, 33 rpm)



MICRO COMPUTER MB8841-566M

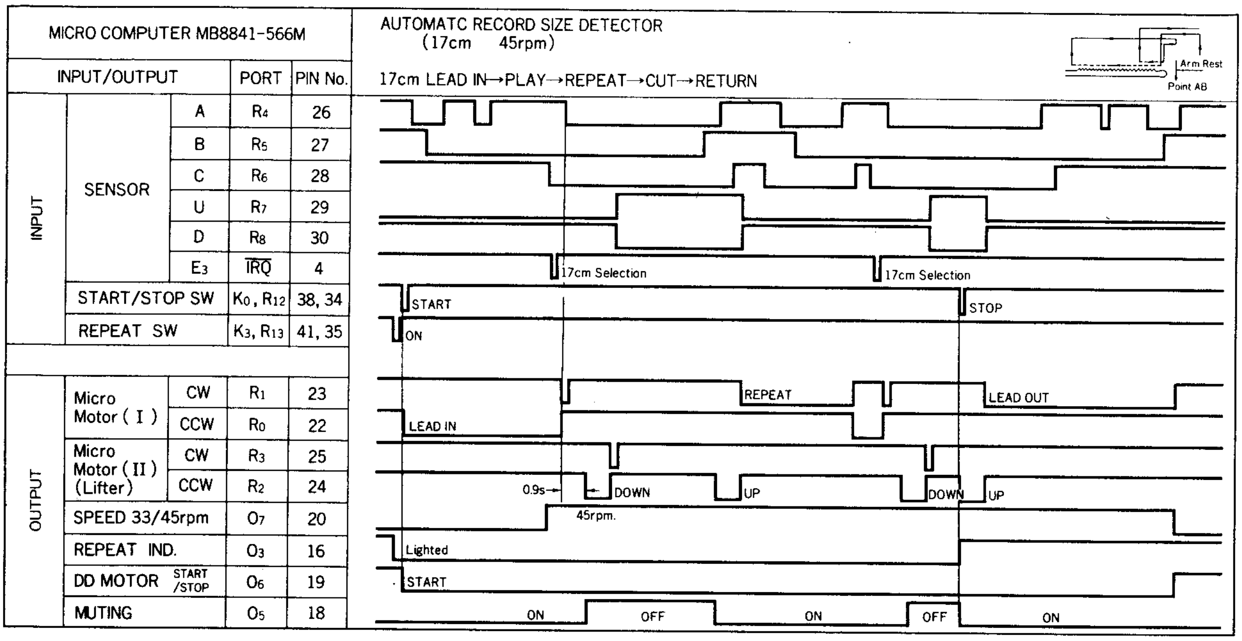
INPUT/OUTPUT			PORT	PIN No.
INPUT	SENSOR	A	R_4	26
		B	R_5	27
		C	R_6	28
		U	R_7	29
		D	R_8	30
		E_2	TC	8
		E_3	IRQ	4
		F_2	R_{11}	33
	START/STOP SW.		R_{12}, K_0	34, 38
	UP/DOWN SW.		R_{13}, K_2	35, 40
	MUSIC SELECTION SW.	2	R_{15}, K_2	37, 40
		3	R_{15}, K_1	37, 39
		5	R_{14}, K_0	36, 38
OUTPUT	MICRO MOTOR (I)	CW	R_1	23
		CCW	R_0	22
	MICRO MOTOR (II) (Lifter)	CW	R_3	25
		CCW	R_2	24
	DD MOTOR	START /STOP	O_6	19
	MUTING		O_5	18
	SPEED 33/45rpm.		O_7	20
	MUSIC SELECTION Indicator	2	P_1	10
		3	P_2	11
		5	O_0	13

AUTO MUSIC SELECTION 2-3-5(30cm, 33rpm)

MUSIC SELECTION(2-3-5)→LEAD IN(1)→PLAY2→
→PLAY3→CUT(UP/DOWN)→PLAY5→LEAD OUT

• MICRO COMPUTER

Timing chart 2 AUTOMATIC RECORD SIZE DETECTOR (17cm, 45 rpm)

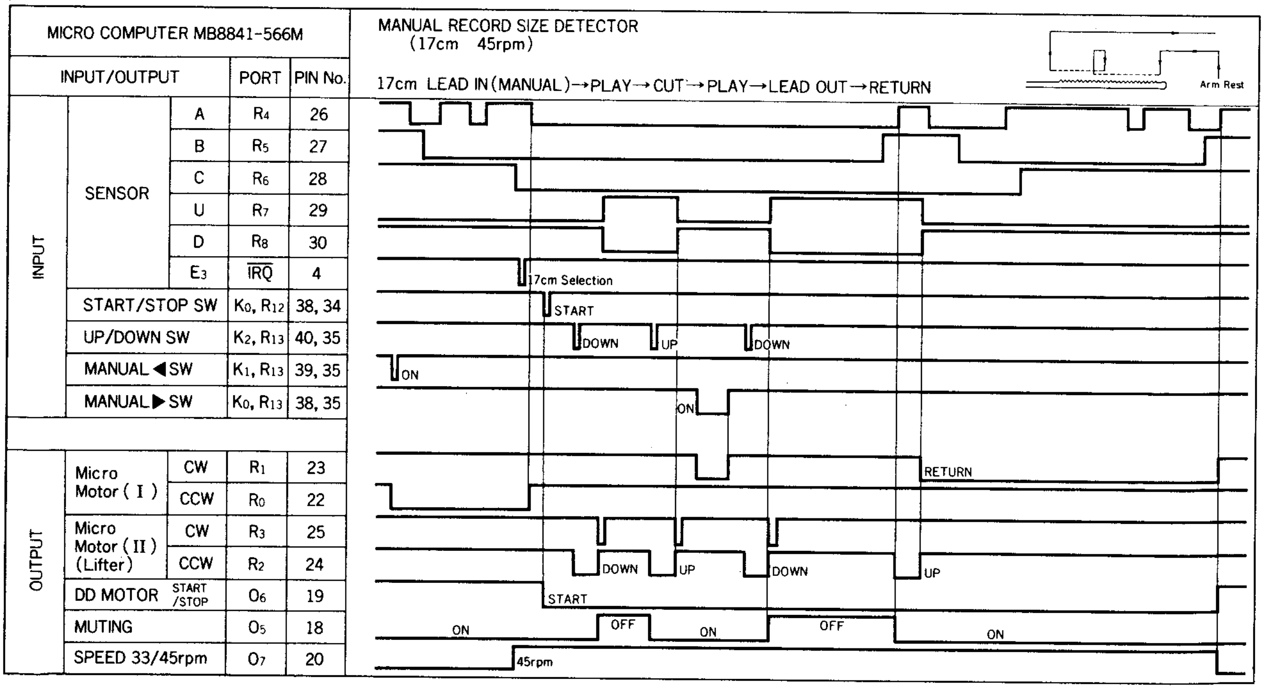


MICRO COMPUTER MB8841-566M				
INPUT/OUTPUT			PORT	PIN No.
INPUT	SENSOR	A	R_4	26
		B	R_5	27
		C	R_6	28
		U	R_7	29
		D	R_8	30
		E_3	$\overline{IRQ}$	4
	START/STOP SW		K_0, R_{12}	38, 34
	REPEAT SW		K_3, R_{13}	41, 35
OUTPUT	Micro Motor (I)	CW	R_1	23
		CCW	R_0	22
	Micro Motor (II) (Lifter)	CW	R_3	25
		CCW	R_2	24
	SPEED 33/45rpm		O_7	20
	REPEAT IND.		O_3	16
	DD MOTOR START /STOP		O_6	19
	MUTING		O_5	18

AUTOMATC RECORD SIZE DETECTOR
(17cm 45rpm)
17cm LEAD IN→PLAY→REPEAT→CUT→RETURN
Arm Rest
Point AB
17cm Selection
17cm Selection
START
STOP
ON
REPEAT
LEAD OUT
LEAD IN
0.9s
DOWN
UP
DOWN
UP
45rpm.
Lighted
START
ON
OFF
ON
OFF
ON

• MICRO COMPUTER

Timing chart 3 MANUAL RECORD SIZE DETECTOR (17cm, 45 rpm)



MICRO COMPUTER MB8841-566M				
INPUT/OUTPUT			PORT	PIN No.
INPUT	SENSOR	A	R_4	26
		B	R_5	27
		C	R_6	28
		U	R_7	29
		D	R_8	30
		E_3	$\overline{IRQ}$	4
	START/STOP SW		K_0, R_{12}	38, 34
	UP/DOWN SW		K_2, R_{13}	40, 35
	MANUAL ◀ SW		K_1, R_{13}	39, 35
	MANUAL ▶ SW		K_0, R_{13}	38, 35
OUTPUT	Micro Motor (I)	CW	R_1	23
		CCW	R_0	22
	Micro Motor (II) (Lifter)	CW	R_3	25
		CCW	R_2	24
	DD MOTOR START /STOP		O_6	19
	MUTING		O_5	18
	SPEED 33/45rpm		O_7	20

MANUAL RECORD SIZE DETECTOR
(17cm 45rpm)
17cm LEAD IN(MANUAL)→PLAY→CUT→PLAY→LEAD OUT→RETURN
Arm Rest
17cm Selection
START
DOWN
UP
DOWN
ON
ON
RETURN
DOWN
UP
DOWN
UP
START
ON
OFF
ON
OFF
ON
45rpm

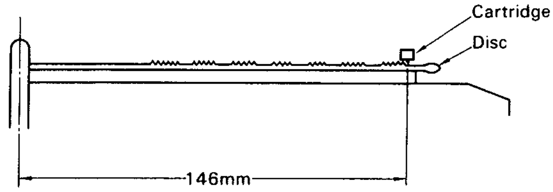
3. ADJUSTMENTS

Note: Before adjustments of 3-1 and 3-2, remove the arm rest only.

3-1. Adjustment of Automatic Disk Size Selection Operation (See Figs. 3-1, 3-3 and 3-4)

1) By using 30cm size record, actually carry out the automatic disk size operation (lead-in operation). Adjust the lead-in adjusting cam (See Fig. 3-4) by the tone arm placed on the arm rest (the position Ⓐ as shown in Fig. 3-3 so that the stylus tip may come down to the position (the lead-in groove position) 146 mm away from the disk center (See Fig. 3-1).
2) By using 17cm size record, actually carry out the automatic disk size operation (lead-in operation). Confirm that the stylus tip may come down to the lead-in groove position.

Fig. 3-1


Cartridge
Disc
146mm

3-2. Adjustment of Automatic Music Selection Operation (See Figs. 3-2, 3-3 and 3-4)

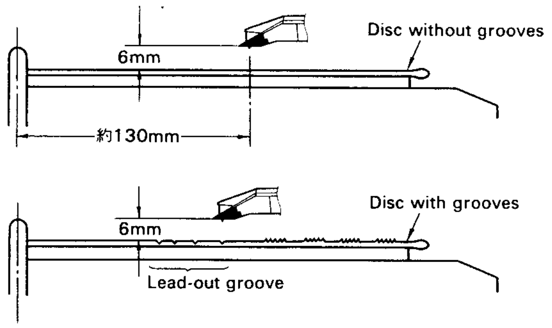
- **Required disc and measuring instruments**

1) Tester (DC voltmeter)
   Input impedance: 50kohm/V or more. (The higher, the better)
2) A vinyl chloride record disc without grooves or with wider lead-out spiral than usual.
3) A rule with graduation marks starting from the edge.

A. Tone Arm Height Adjustment

Adjust the stylus and disk as shown in Fig. 3-2, by rotating the tone arm height adjusting screw (See Fig. 3-4) to the position Ⓑ as shown in Fig. 3-3. (Stop the stylus at a position about 130 mm away from the disk center.)

Fig. 3-2


Disc without grooves
6mm
約130mm
Disc with grooves
6mm
Lead-out groove

B. Sensitivity adjustment of E and F sensor

1. Setting
   At the tone arm position, in case of a record disc without grooves, stop the stylus at a position about 10 cm away from the disc center. In case of a record disc having grooves, stop the stylus above the flat surface nears 10 cm away from the disc center.
2. How to adjust (See Fig. 3-3, Top View on Page 8)

a) Connect the DC voltmeter across the test terminal E and G (ground) and then adjust the voltage to DC 1V by rotating the volume (fVR1) <E sensor adjustment>
b) Connect the DC voltmeter across the test terminal F and G (ground) and then adjust the voltage to DC 1V by rotating the volume (fVR2) <F sensor adjustment>

Note: When adjusting both the sensors with the stylus stopped on a lead-over groove of an ordinary record disc, note that there is a difference in detection position between E sensor (leading sensor) and F sensor.

C. Level adjustment of F2 signal

1. Setting
   Set the stylus in the same way as described under Section 2, and then move the tone arm downward. (Check that the stylus stays on a lead-over groove.)
2. How to adjust (See Fig. 3-3, Top View on Page 8)

a) Connect the DC voltmeter across test terminal F_2 and G (ground) and then adjust the voltage to DC 1V by rotating the volume (fVR3).

Fig. 3-3

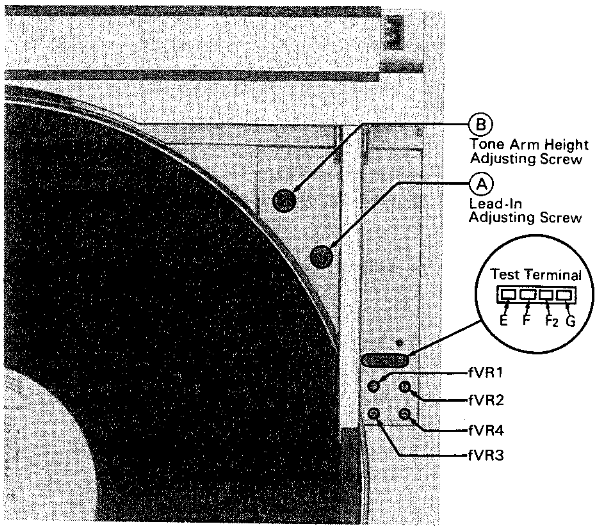
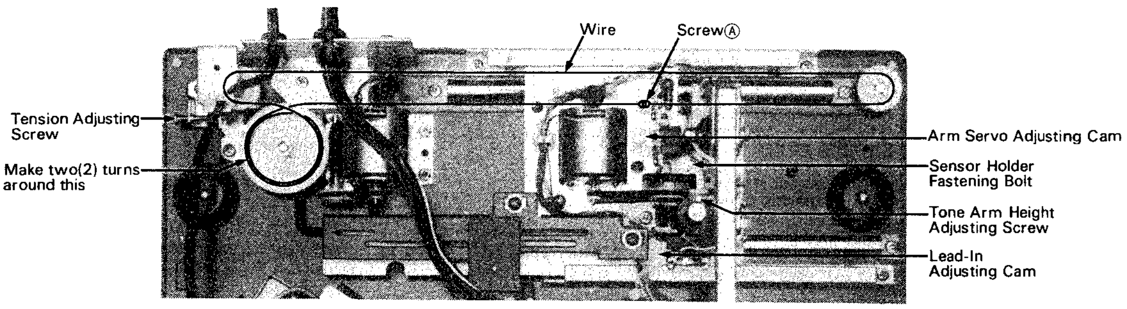

Ⓑ
Tone Arm Height Adjusting Screw
Ⓐ
Lead-In Adjusting Screw
Test Terminal
E F F2 G
fVR1
fVR2
fVR4
fVR3

Fig. 3-4


Wire
ScrewⒶ
Tension Adjusting Screw
Make two(2) turns around this
Arm Servo Adjusting Cam
Sensor Holder Fastening Bolt
Tone Arm Height Adjusting Screw
Lead-In Adjusting Cam

D. Delay adjustment of E_2 signal

1. Setting

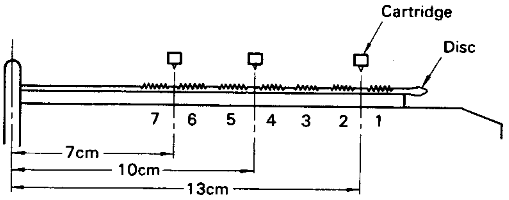
Use the record disk in which many musics (about seven music tracks) are recorded, and select three music tracks having lead-over grooves, respectively, near positions 70mm, 100mm, and 130mm away from the disc center.

2. Adjustment (See Fig. 3-5, Top View on Page 8)

Perform the respective lead-in operations for three selected music tracks, and adjust the operations by rotating the volume (fVR4) as shown in Fig. 3-3 so that the stylus comes down on or a little before the lead-over grooves for the three music tracks. If the volume (fVR4) is rotated clockwise, the lift-down position of the stylus is shifted inward.

Note: In the lead-over grooves existing on a 70mm-or-less from the center, the misplacing of the arm in detection position occurs inevitably.

Fig. 3-5



Note: Remove the cabinet before adjustments of 3-3 and 3-4.

- **How to remove the cabinet. (See Top View on Page 8)**

1) Unscrew seven cabinet-mounting screws on the bottom of the chassis.
2) Remove the E-ring fixing the turntable to the spindle of the motor.
3) Remove the player case cover.
4) Move the tone arm to the player case cover position by depressing the MANUAL key (◀), before removing the cabinet.

3-3. Arm Servo Adjustment (See Fig. 3-4, Fig. 3-6)

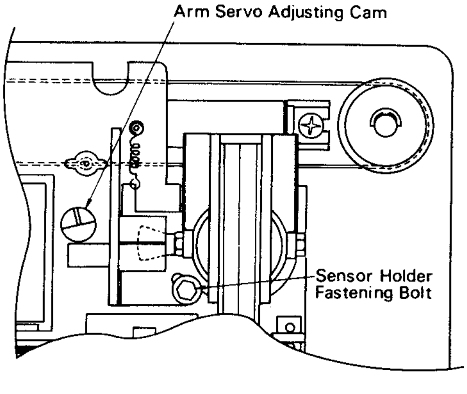
A. Setting

1) Move the tone arm leftward and stop it within the record-playable range by depressing the MANUAL key (▶).
2) Move the tone arm downward by depressing the UP/DOWN key.

B. Adjustment

1) Loosen the sensor holder fastening bolt, and adjust the arm servo adjusting cam so that the tone arm does not move in either direction, in the state where the tone arm is in the down position.
2) After adjustment, check that the voltage across the connector terminals No. 9 or TP6 and GND of S-0107 (across the terminals of the micromotor (I) is within 0V ±1V when the sensor holder fastening hexagon bolt is fastened.
3) Check that the tone arm will not move in either direction when the UP/DOWN key is depressed repeatedly.

Fig. 3-6



3-4. Tension Adjustment of Tone Arm Horizontally Driving Wire (See Fig. 3-4)

Move the tone arm by depressing the MANUAL key and adjust the tension adjusting screw so that the wire does not slip along the driving gear.

Note: Care must be taken not to fasten the tension adjusting screw too tightly.

- **Variable resistors in the DD motor control circuit**

The variable resistors (eVR1, eVR2 and eVR3) in the DD motor control circuit are used for adjusting wow and flutter. These variable resistors have already been adjusted accurately before shipped, because a special measuring instrument is required for adjustment. Therefore, when the motor is required to be replaced by a new one because of irreqular rotation, replace the motor assembly and all (Stock No. 18022201).

4. OTHER PARTS

Parts List <Front View>

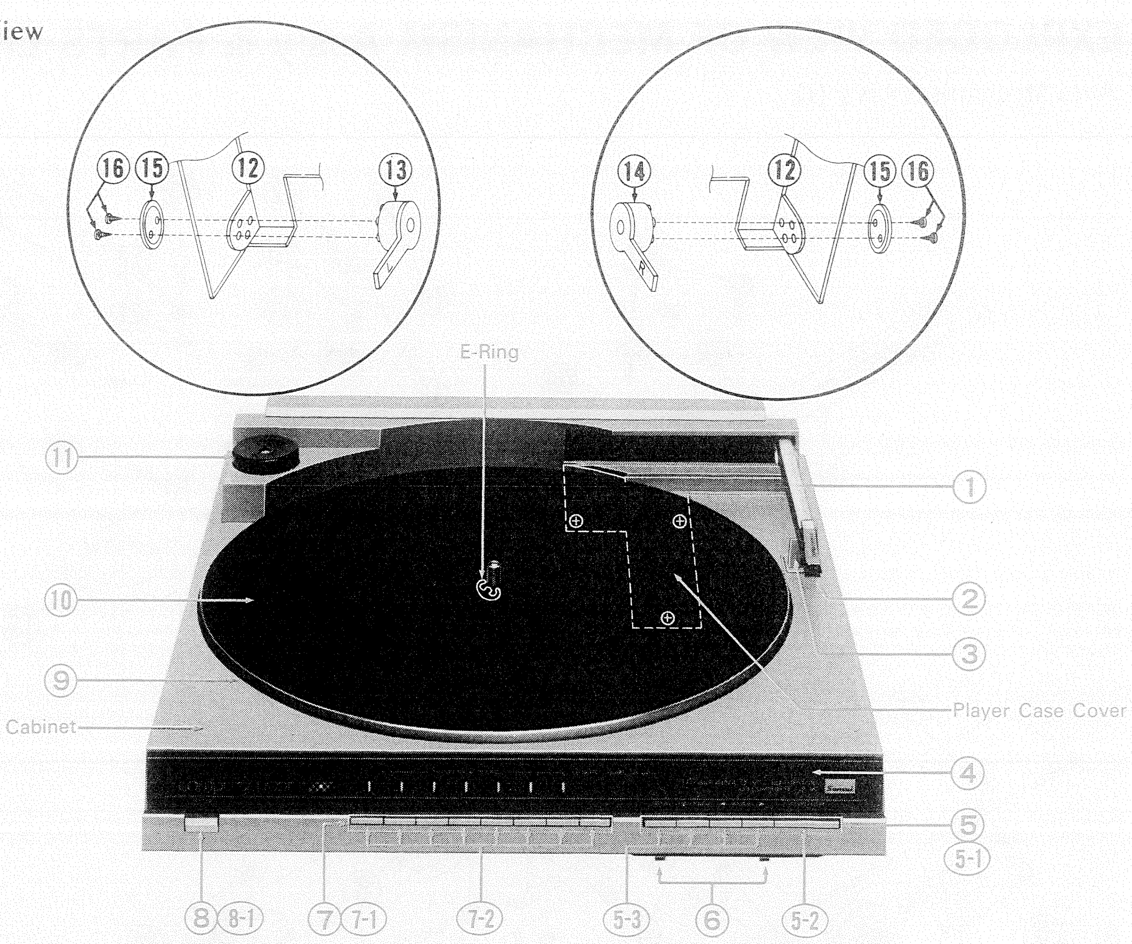
Parts No.	Stock No.	Description
1	18026401	Tone Arm Ass'y with Cartridge SV-S303
2	13110600	Stylus, SN-S303
3	13103900	Arm Rest
4	13105000	Control Plate
5	18025401	Push Knob Ass'y (1)
5-1	———	Mounting Plate, push knob
5-2	13099700	Push Knob, START/STOP
5-3	13099800	Push Knob, MANUAL, UP/DOWN, REPEAT
6	13100000	Slide Knob, SPEED, SENSITIVITY
7	18025501	Push Knob Ass'y (2)
7-1	———	Mounting Plate, push knob
7-2	13099800	Push Knob, CLEAR, music selection 1 ~ 7
8	13099900	Push Knob, POWER
8-1	———	Knob Holder
9	13099210	Turntable Platter
10	13099110	Turntable Sheet
11	13012300	EP Adaptor
12	13112000	Dust Cover Ass'y
13	13113600	Side Hinge (L)
14	13113700	Side Hinge (R)
15	13113800	Hinge Cap
16	13115100	Screw, M2.6 x 8
	13097300	Insulator

Note: Parts without Stock Nos. are not supplied even parts names are listed in the parts list.

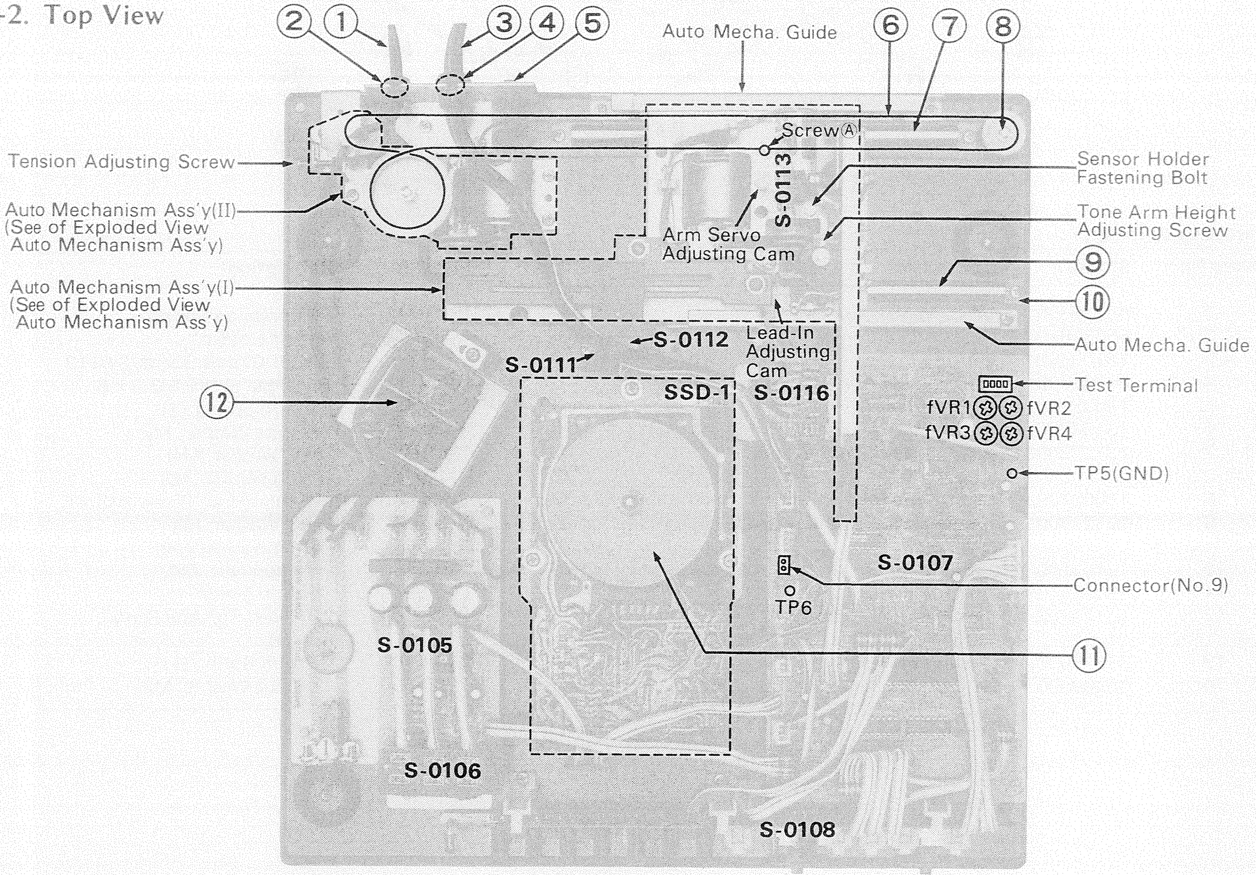
Parts List <Top View>

Parts No.	Stock No.	Description
1	38004700	Power Supply Cord
2	39106000	Strain Relief
3	13062500	Output Cord
4	39105700	Strain Relief
5	46170400	Jack, computer editing
6	13097910	Wire
7	13097400	Pipe (S)
8	13098300	Pulley (B)
9	13106000	Pipe (L)
10	13106200	Pipe Holder
11	18022201	SSD-1 DD Motor Ass'y with control circuit board S-0097
12	15005801	Power Transformer
	07204700	Slide Switch, voltage selector

4-1. Front View

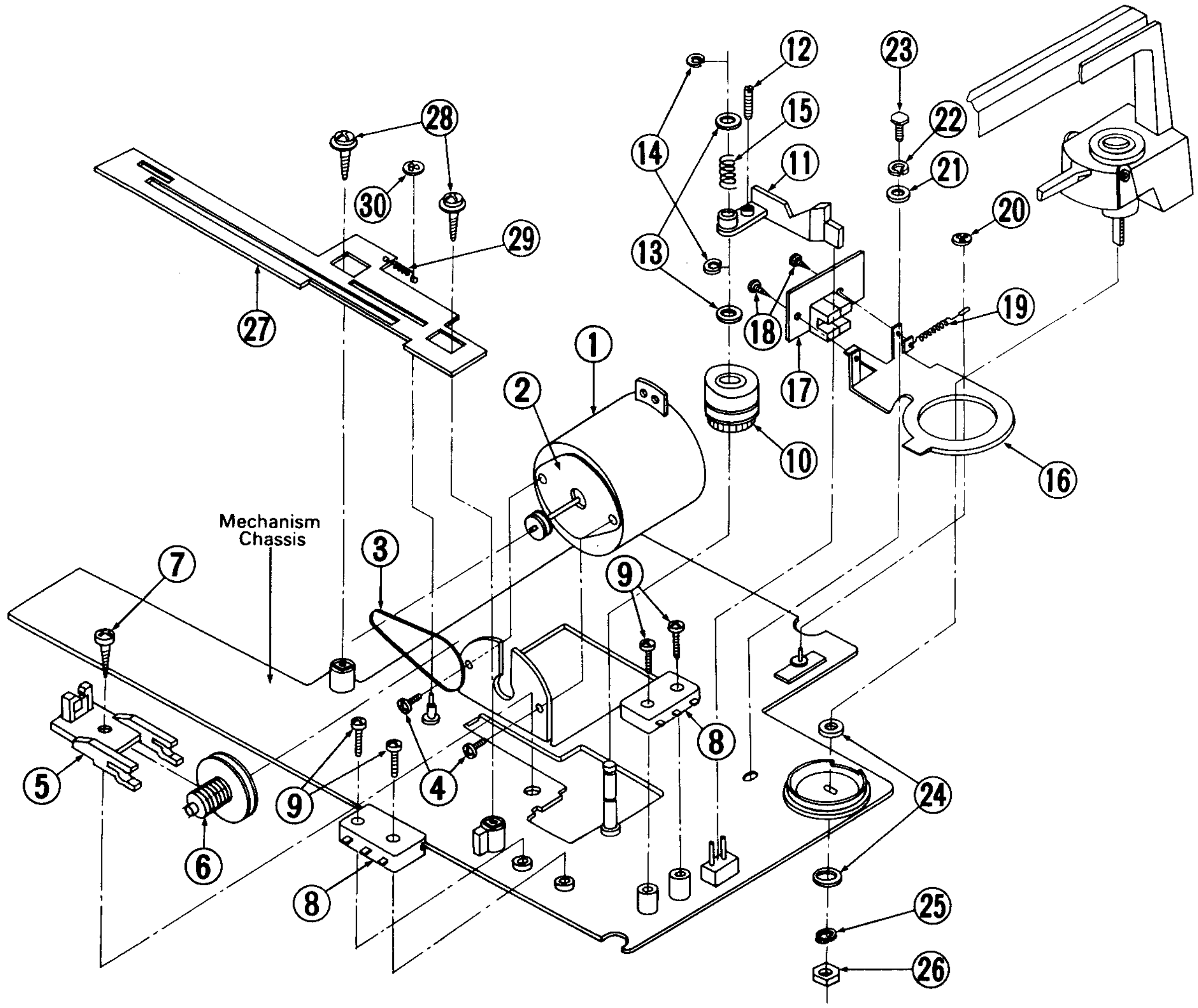

⑯
⑮
⑫
⑬
⑭
⑫
⑮
⑯
E-Ring
⑪
①
⑩
②
⑨
③
Cabinet
Player Case Cover
④
⑤
5-1
⑧ 8-1
⑦ 7-1
7-2
5-3
⑥
5-2

4-2. Top View


② ①
③ ④ ⑤
Auto Mecha. Guide
⑥ ⑦ ⑧
Screw Ⓐ
Tension Adjusting Screw
Sensor Holder Fastening Bolt
S-0113
Auto Mechanism Ass'y(II) (See of Exploded View Auto Mechanism Ass'y)
Tone Arm Height Adjusting Screw
Arm Servo Adjusting Cam
⑨
Auto Mechanism Ass'y(I) (See of Exploded View Auto Mechanism Ass'y)
⑩
Auto Mecha. Guide
S-0112
Lead-In Adjusting Cam
S-0111
SSD-1
S-0116
Test Terminal
⑫
fVR1
fVR2
fVR3
fVR4
TP5(GND)
S-0107
Connector(No.9)
TP6
⑪
S-0105
S-0106
S-0108

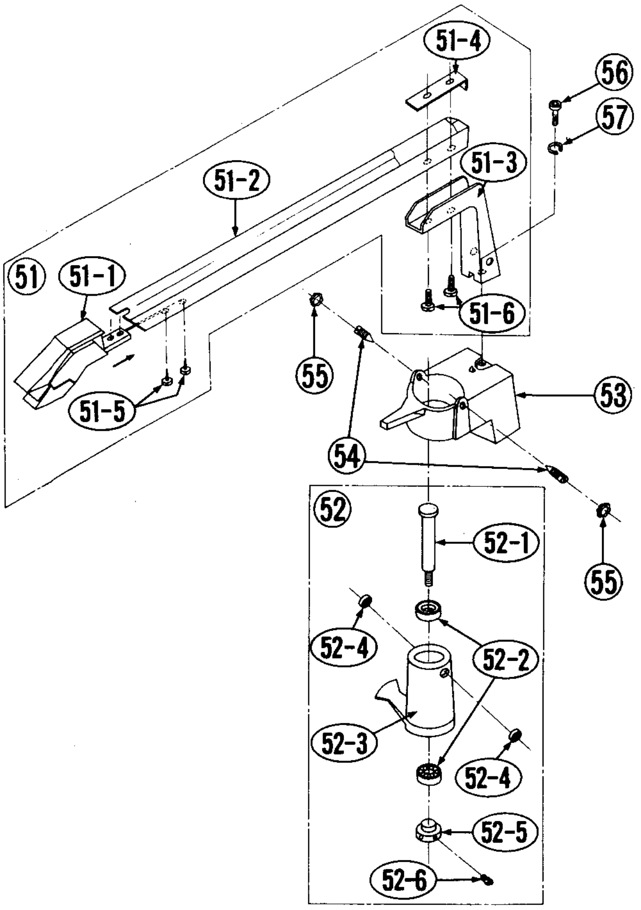
5. EXPLODED VIEW OF MECHANISM Ass'y & PARTS LIST

5-1. Auto Mechanism Ass'y (I)

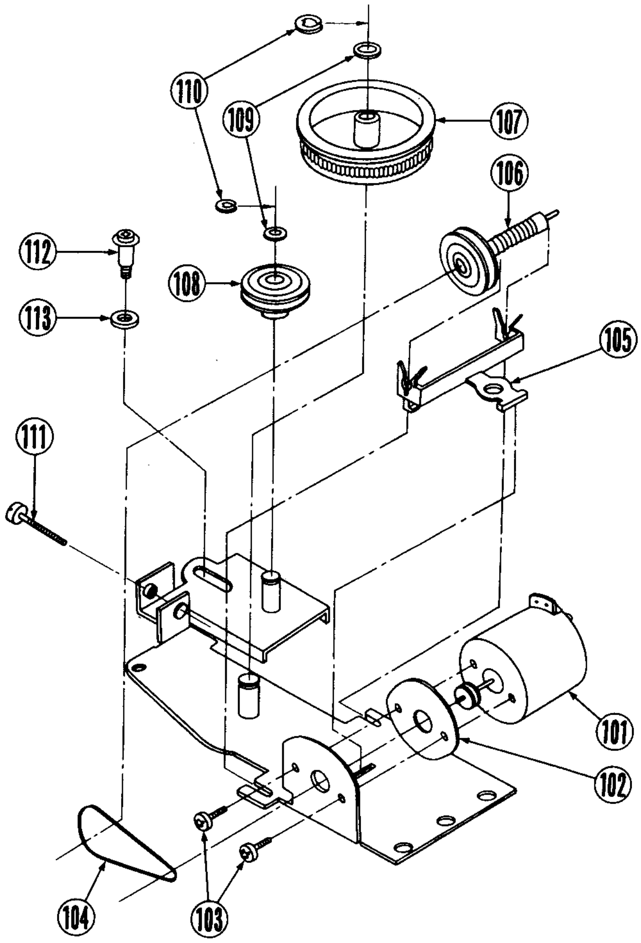


Parts List <①~㉚>

Parts No.	Stock No.	Description
1	46176300	Micro Motor
2	55029810	Rubber Cushion
3	13103800	Belt (B)
4	00436500	Pan Head Screw, M2 x 4
5	13098100	Shaft Guide (B)
6	13134200	Warm Shaft Ass'y (B)
7	13122300	Binding Head Deltite Screw, M3 x 6
8	11602700	Micro Switch
9	13127800	Binding Head Tapping Screw, M2 x 12
10	13103700	Lifter Cam
11	13098910	Lifter Plate
12	13115200	Slot Type Set Screw, M3 x 10
13	51825000	Thrust Washer, FT3
14	00489000	E Type Washer, D2
15	13111600	Compression Spring
16	13097800	Sensor Holder
17	———	Sensor Circuit Board, S-0113
18	00421300	Pan Head Screw M2.6 x 6
19	13111500	Tension Spring (2)
20	51830000	CS-Type Washer, M2
21	00466500	Plane Washer, M4
22	00469700	Spring Washer, M3
23	51626500	Hexagon Head Screw, M3 x 6
24	00466700	Plane Washer, M4
25	00469800	Spring Washer, M4
26	00463800	Hexagon Nut, M4
27	13096810	Position Guide
28	51625100	Pan Head Tapping Screw, M3 x 8
29	13111400	Tension Spring (1)
30	51830000	CS-Type Washer, M2


51-4
56
57
51-2
51-3
51
51-1
51-6
55
53
51-5
54
52
52-1
55
52-4
52-2
52-3
52-4
52-5
52-6

5-2. Auto Mechanism Ass'y (II)


110
109
107
106
112
108
113
105
111
101
102
104
103

Parts List <(51)~(57)>

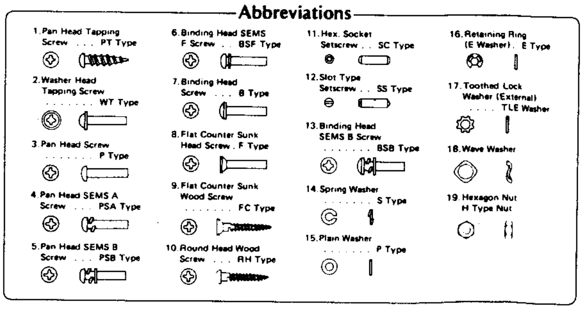
Parts No.	Stock No.	Description
51	18026401	Tone Arm Ass'y
51-1	———	Cartridge, SV-303
51-2	———	Pipe
51-3	———	Pipe Holder
51-4	———	GND Rag
51-5	———	Pan Head Tapping Screw, M2 x 4
51-6	———	Pan Head Screw, M2 x 4
52	18026501	Arm Shaft Bearing Ass'y
52-1	———	Arm Shaft Bearing
52-2	———	Radial Bearing
52-3	———	Arm Bearing
52-4	———	Pivot Bearing
52-5	———	Holder Ring
52-6	———	Slot Type Set Screw, M2.5 x 2.5
53	13096700	Holder Weight
54	13114100	Pivot
55	00463600	Hexagon Nut, M3
56	13127200	Hexagon Socket Head Screw, M3 x 10
57	00469700	Spring Washer, M3

Note: Parts without Stock Nos. are not supplied even parts name are listed in the parts list.

Parts List <(101)~(113)>

Parts No.	Stock No.	Description
101	46176300	Micro Motor
102	55029810	Rubber Cushion
103	00436500	Pan Head Screw, M2 x 4
104	60322310	Belt (A)
105	13098400	Warm Shaft Guide (A)
106	13134100	Warm Shaft Ass'y (A)
107	13098500	Drive Gear
108	13098300	Pulley (B)
109	51822600	Thrust Washer, FT4
110	00489200	E Type Washer, D3
111	00437600	Pan Head Screw, M3 x 20
112	13112800	Flanged Screw, M3
113	00466700	Plane Washer, M4

Abbreviations

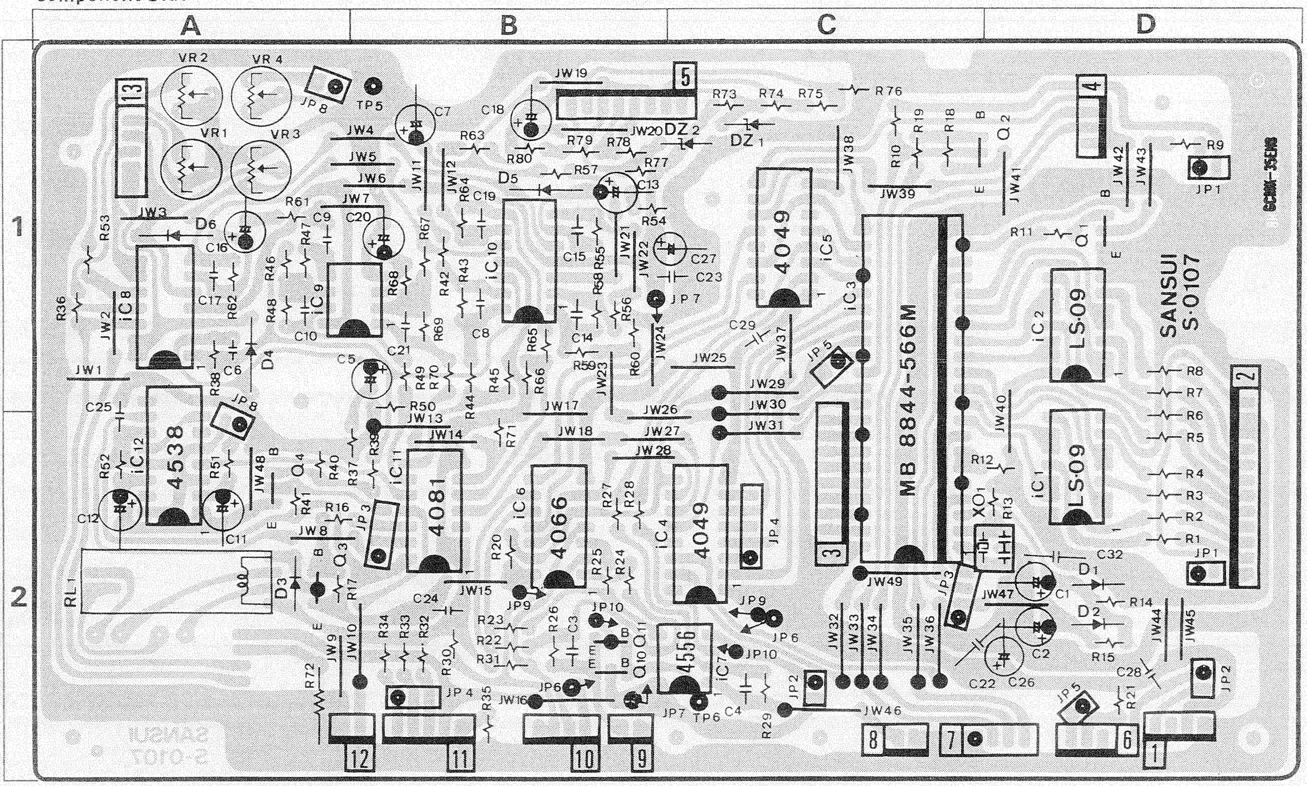

1. Pan Head Tapping Screw . . . PT Type
2. Washer Head Tapping Screw . . . . WT Type
3. Pan Head Screw . . . . P Type
4. Pan Head SEMS A Screw . . . PSA Type
5. Pan Head SEMS B Screw . . . PSB Type
6. Binding Head SEMS F Screw . . BSF Type
7. Binding Head Screw . . . B Type
8. Flat Counter Sunk Head Screw . F Type
9. Flat Counter Sunk Wood Screw . . . . FC Type
10. Round Head Wood Screw . . . RH Type
11. Hex. Socket Setscrew . . SC Type
12. Slot Type Setscrew . . SS Type
13. Binding Head SEMS B Screw . . . . BSB Type
14. Spring Washer . . . . S Type
15. Plain Washer . . . . P Type
16. Retaining Ring (E Washer) . E Type
17. Toothed Lock Washer (External) . . . . TLE Washer
18. Wave Washer
19. Hexagon Nut H Type Nut

6. PARTS LOCATION & PARTS LIST

●Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the Common Parts List for capacitors & resistors, which was appended previously to Sansui Manual.

6-1. S-0107 T.A. Control Circuit Board (Stock No. 13108601)

Component Side



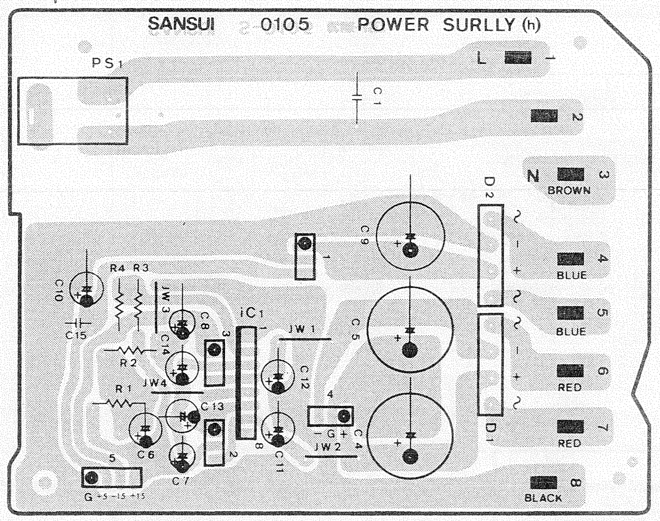
Parts List

Parts No.	Stock No.	Description
fXO1	46149200	Ceramic OSC Element 3.58 MHz
●Transistor		
fQ1	07194801	2SC1815
	or 03059501	2SC945
	or 07299701	2SC2603
fQ2	07194801	2SC1815
	or 03059501	2SC945
	or 07299701	2SC2603
fQ3	07194701	2SA1015
	or 07197001	2SA733A
	or 07299601	2SA1115
fQ4	07194801	2SC1815
	or 03059501	2SC945
	or 07299701	2SC2603
fQ10	07263501	2SD600
	or 46149401	2SD794
fQ11	07263401	2SB631
	or 46149301	2SB744
●IC		
fIC1	46160200	MB74LS09
	or 46160300	M74LS09
fIC2	46160200	MB74LS09
	or 46160300	M74LS09
fIC3	46165200	MB8841-566M
fIC4	03611800	MSM4049RS
	or 46160400	MB84049B
fIC5	03611800	MSM4049RS
	or 46160400	MB84049B
fIC6	46164300	MB84066B
	or 07264600	MSM4066RS
fIC7	46160700	NJM4556
fIC8	07258300	MB3614M

Parts No.	Stock No.	Description
fIC9	46173100	NJM2904D
	or 46173200	μPC358C
fIC10	07205200	NJM2902N
	or 07258300	MB3614M
fIC11	07272700	MSM4081RS
	or 46164400	MB84081B
fIC12	46122900	MSM4538RS
	or 46160800	TC4538BP
●Diode		
fD1 ~ 3	03111600	1S2473D
fD4 ~ 6	03103300	1N60
●Zener Diode		
fDZ1	46102600	05Z8.2-Z
fDZ2	46102600	05Z8.2-Z
fC16	46028100	22μF 25V E.C.
fC22	07214600	0.15μF 25V C.C.
fC23	07213600	22000pF 25V C.C.
fC24	07213600	22000pF 25V C.C.
fC25	07213600	22000pF 25V C.C.
fC28	07213600	22000pF 25V C.C.
fC29	07213600	22000pF 25V C.C.
fC32	07214600	0.15μF 25V C.C.
fVR1	10352300	Semi Variable Resistor 470kΩ (B), E Sensor adj.
fVR2	10352300	Semi Variable Resistor 470kΩ (B), F Sensor adj.
fVR3	10342700	Semi Variable Resistor 10kΩ (B), F_2 Sensor adj.
fVR4	10343700	Semi Variable Resistor 470kΩ (B), E_2 Sensor adj.
fRL1	46173300	Relay

6-2. S-0105 Power Supply Circuit Board (Stock No. 13108401)

Component Side


SANSUI 0105 POWER SURLLY (h)
PS1
C1
L
N
BROWN
BLUE
BLUE
RED
RED
BLACK
D2
D1
C9
C5
C4
iC1
JW1
JW2
JW3
JW4
R4 R3
R2
R1
C10
C15
C14
C8
C12
C13
C11
C6
C7
G +5 -15 +15

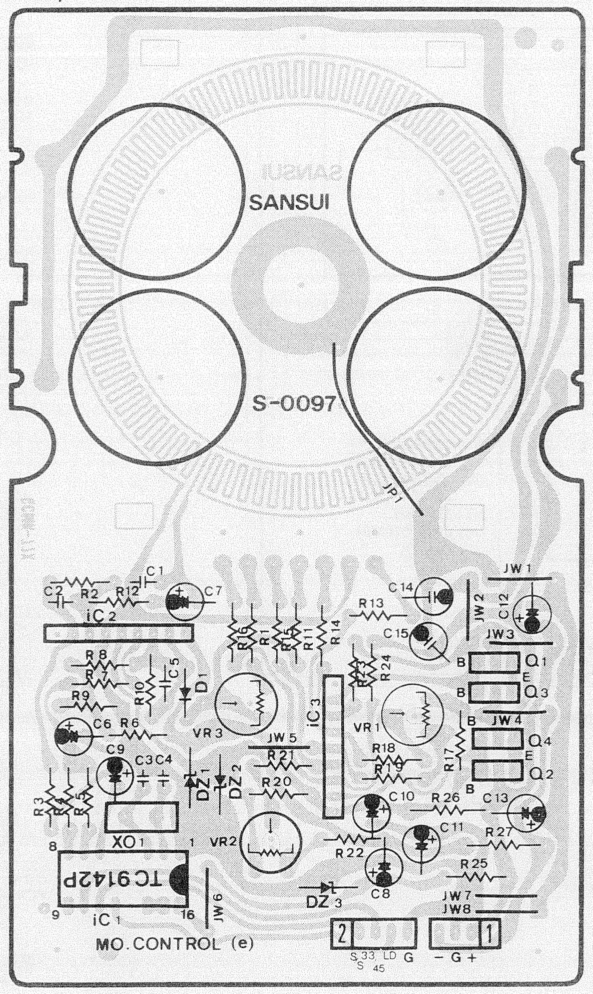
Parts List

Parts No.	Stock No.	Description
●IC		
hIC1	46160100	M5230L
●Diode		
hD1	03117000	RB-152
hD2	03117000	RB-152
hC1	00386000	10000pF 150V C.C.
hC15	07214000	47000pF 25V C.C.
hSW1	07270400	Push Switch, POWER

● Note: The circuit boards, S-0097, S-0108, S-0106, S-0111, S-0112 & S-0113 are not supplied as the assembled. However, individual parts on the circuit board are provided by orders.

6-3. S-0097 DD Motor Control Circuit Board

Component Side

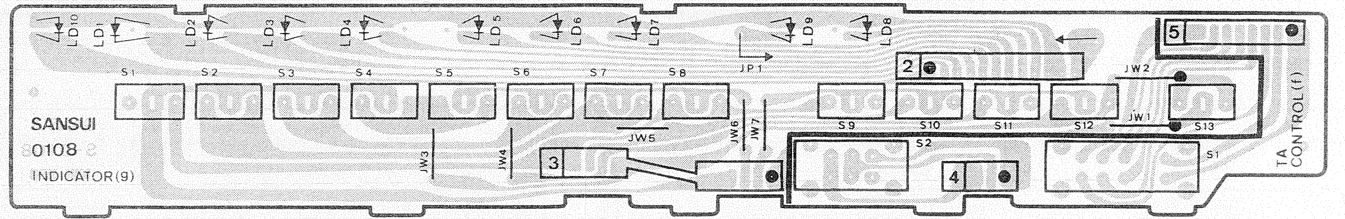

SANSUI
S-0097
JP1
C1
C2
C7
R2
R12
iC2
R13
C14
JW1
JW2
JW3
C12
C15
R14
R24
Q1
Q3
Q4
Q2
JW4
JW5
VR1
VR2
VR3
R18
R17
R21
R20
R22
R25
R26
R27
C10
C11
C13
C8
C9
C3C4
C6 R6
R8
R9
D1
DZ1
DZ2
DZ3
XO1
iC3
TC9142P
iC1
JW6
JW7
JW8
MO.CONTROL (e)
2
1
S33 LD G -G+

Parts List

Parts No.	Stock No.	Description
●Hall IC		
	46172600	HA-200A with Board
●Transistor		
eQ1	46149401	2SD794
eQ2	46149401	2SD794
eQ3	46149301	2SB744
eQ4	46149301	2SB744
●IC		
eIC1	46146400	TC9142P
eIC2	46147700	M5218L
	or 46087100	NJM4558S
	or 46146500	BA715
eIC3	46147700	M5218L
	or 46087100	NJM4558S
	or 46146500	BA715
eXO1	46159700	Quartz Element 5.5296 MHz
●Diode		
eD1	03111600	1S2473D
●Zener Diode		
eDZ1	46104300	05Z15-Y
eDZ2	46104300	05Z15-Y
eDZ3	03166300	RD5.1E
eC1	07213600	22000pF 25V C.C.
eC2	07211300	1000pF 25V C.C.
eC5	07214000	47000pF 25V C.C.
eC14	00305800	2.2μF 25V E.C.
eC15	00305800	2.2μF 25V E.C.
eVR1	07241100	Semi Variable Resistor 2kΩ (B)
eVR2	07241100	Semi Variable Resistor 2kΩ (B)
eVR3	07241000	Semi Variable Resistor 1kΩ (B)

6-4. S-0108 Control Circuit & Indicator Circuit Board

Component Side


LD10
LD1
LD2
LD3
LD4
LD5
LD6
LD7
LD9
LD8
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
JP1
JW1
JW2
JW3
JW4
JW5
JW6
JW7
SANSUI
0108
INDICATOR (9)
TA CONTROL (f)
2
3
4
5

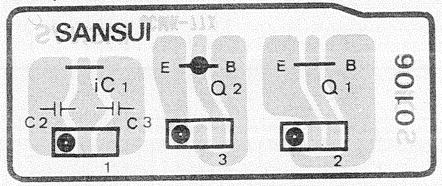
Parts List

Parts No.	Stock No.	Description
gLD1 ~ 8	46162500	Light Emitting Diode SLR-54URC (Red)
gLD9	46189700	Light Emitting Diode SLR-54PC5 (Green)
gLD10	46162500	Light Emitting Diode SLR-54URC (Red)
gSW1 ~ 7	11320900	Push Switch (Tact), RANDOM ACCESS PROGRAM 1 ~ 7

Parts No.	Stock No.	Description
gSW8	11320900	Push Switch (Tact), CLEAR
gSW9	11320900	Push Switch (Tact), REPEAT
gSW10	11320900	Push Switch (Tact), UP/DOWN
gSW11	11320900	Push Switch (Tact), MANUAL
gSW12	11320900	Push Switch (Tact), MANUAL
gSW13	11320900	Push Switch (Tact), START/STOP
fS1	07249800	Slide Switch, SENSITIVITY
fS2	07249900	Slide Switch, SPEED

6-5. S-0106 Power Supply Circuit Board

Component Side

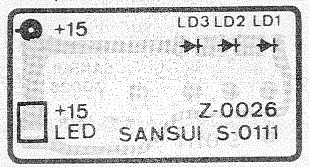

SANSUI
iC1
C2
C3
E B
Q2
E B
Q1
0106
1
3
2

Parts List

Parts No.	Stock No.	Description
●Transistor		
hQ1	46149401	2SD794
	or 07263501	2SD600
hQ2	46149301	2SB744
	or 07263401	2SB631
●IC		
hIC2	07183500	μPC78M05H
hC2	07214000	47000pF 25V C.C.
hC3	07214000	47000pF 25V C.C.

6-6. S-0111 A, B, C Sensor LED Circuit Board

Component Side

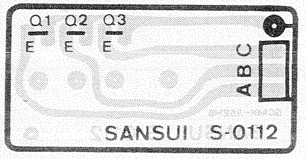

+15
LD3 LD2 LD1
+15
LED
Z-0026
SANSUI S-0111

Parts List

Parts No.	Stock No.	Description
fLD1 ~ 3	46182000	Light Emitting Diode LN25RCP (Red)

6-7. S-0112 A, B, C Sensor Photo TR Circuit Board

Component Side

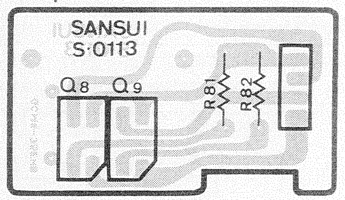

Q1 Q2 Q3
E E E
A B C
SANSUI S-0112

Parts List

Parts No.	Stock No.	Description
●Transistor		
fQ5 ~ 7	46169200	Photo Transistor PN150

6-8. S-0113 Arm Servo Sensor Circuit Board

Component Side


SANSUI
S-0113
Q8
Q9
R81
R82

Parts List

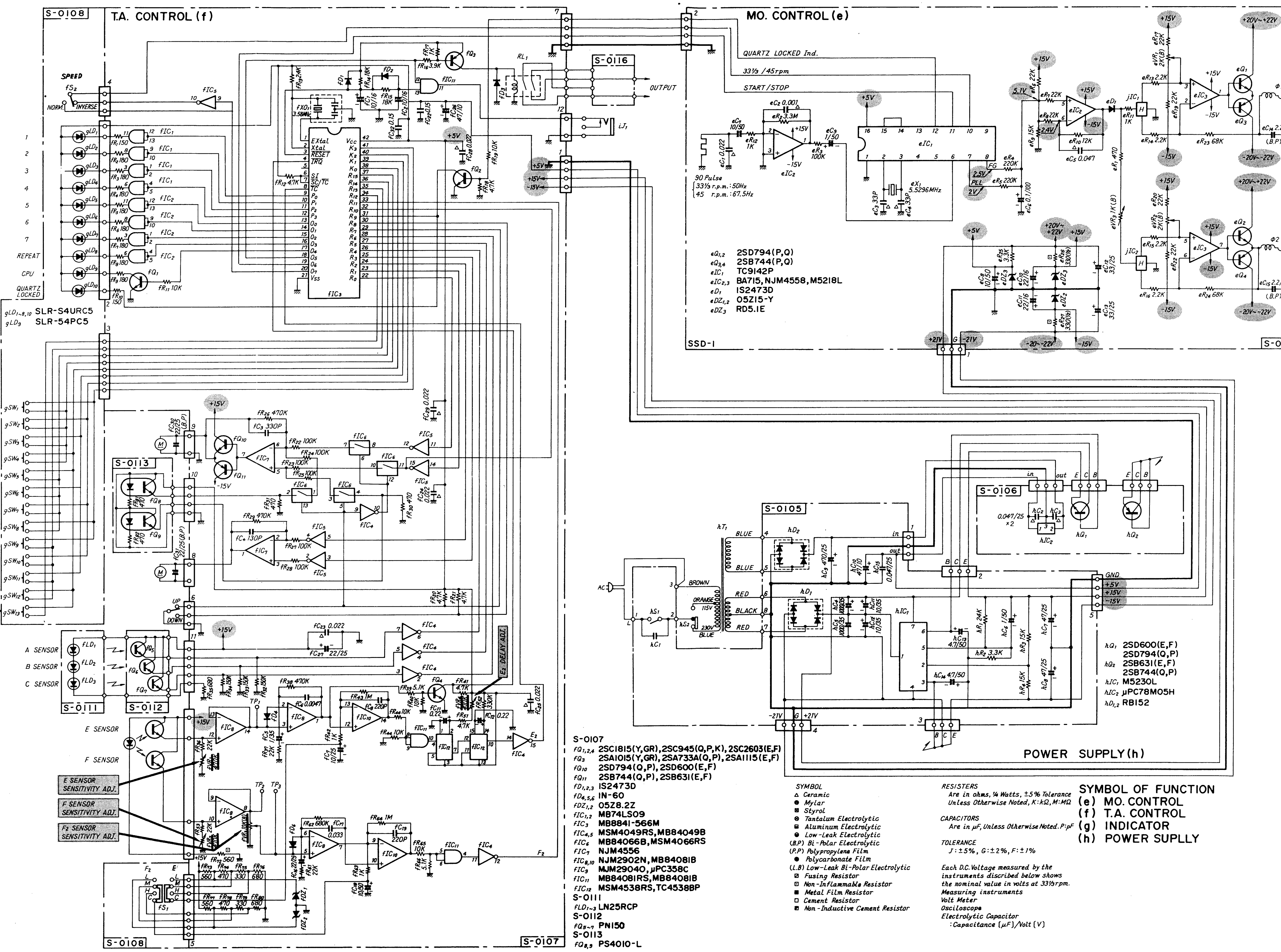
Parts No.	Stock No.	Description
●Transistor		
fQ8, 9	46194301	Photo Coupler PS4010-L

● Abbreviations

C.R.	Carbon Resistor
S.R.	Solid Resistor
Ce.R.	Cement Resistor
M.R.	Metal Film Resistor
F.R.	Fusing Resistor
N.I.R.	Non-Inflammable Resistor
C.C.	Ceramic Capacitor
C.T.	Ceramic Capacitor, Temperature Compensation
E.C.	Electrolytic Capacitor
E.L.	Low Leak Electrolytic Capacitor
E.B.	Bi-Polar Electrolytic Capacitor
E.BL.	Low Leak Bi-Polar Electrolytic Capacitor
Ta.C.	Tantalum Capacitor
F.C.	Film Capacitor
M.P.	Metalized Paper Capacitor
P.C.	Polystyrene Capacitor
G.C.	Gimmic Capacitor

7. SCHEMATIC DIAGRAM

* Design and specifications subject to change without notice for improvement.
* La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
* Anderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.


A
B
C
D
E
F
G
H
1
2
3
4
5
S-0108
T.A. CONTROL (f)
SPEED
fS2
NORM.
INVERSE
REPEAT
CPU
QUARTZ LOCKED
gLD1~8,10 SLR-S4URC5
gLD9 SLR-54PC5
fIC3
fXO1 3.58MHz
EXtal
Xtal
RESET
IRQ
Vcc
Vss
fQ1
fQ2
fQ3
fIC11
+5V
RL1
S-0116
OUTPUT
LJ1
+5V
+15V
-15V
MO. CONTROL (e)
QUARTZ LOCKED Ind.
33⅓/45rpm
START/STOP
eIC1
eIC2
eIC3
eX1 5.5296MHz
90 Pulse
33⅓ r.p.m. : 50Hz
45 r.p.m. : 67.5Hz
FG
PLL
2.5V
2V
5.1V
2.4V
+15V
-15V
+20V~+22V
-20V~-22V
eQ1
eQ2
eQ3
eQ4
jIC1
jIC2
Φ1
Φ2
eC16 2.2/25 (B.P)
eC15 2.2/25 (B.P)
SSD-1
S-0097
+21V
G
-21V
gSW1
gSW2
gSW3
gSW4
gSW5
gSW6
gSW7
gSW8
gSW9
gSW10
gSW11
gSW12
gSW13
CLEAR
REPEAT
UP/DOWN
MANUAL
START/STOP
S-0113
fQ8
fQ9
fQ10
fQ11
fIC4
fIC5
fIC6
fIC7
M
UP
DOWN
A SENSOR
B SENSOR
C SENSOR
fLD1
fLD2
fLD3
fQ5
fQ6
fQ7
S-0111
S-0112
E SENSOR
F SENSOR
E SENSOR SENSITIVITY ADJ.
F SENSOR SENSITIVITY ADJ.
F2 SENSOR SENSITIVITY ADJ.
E2 DELAY ADJ.
TP1
TP2
TP3
fIC8
fIC9
fIC10
fIC12
F2
E2
fS1
S-0108
S-0107
S-0106
in
out
E C B
hIC2
hQ1
hQ2
0.047/25 ×2
S-0105
hT1
BLUE
BROWN
ORANGE
115V
230V
RED
BLACK
AC
hS1
hS2
hC1
hD1
hD2
hIC1
GND
+5V
+15V
-15V
POWER SUPPLY (h)

$eQ_{1,2}$	2SD794(P,Q)
$eQ_{3,4}$	2SB744(P,Q)
eIC_1	TC9142P
$eIC_{2,3}$	BA715, NJM4558, M5218L
eD_1	IS2473D
$eDZ_{1,2}$	05Z15-Y
eDZ_3	RD5.1E

S-0107

$fQ_{1,2,4}$	2SC1815(Y,GR), 2SC945(Q,P,K), 2SC2603(E,F)
fQ_3	2SA1015(Y,GR), 2SA733A(Q,P), 2SA1115(E,F)
fQ_{10}	2SD794(Q,P), 2SD600(E,F)
fQ_{11}	2SB744(Q,P), 2SB631(E,F)
$fD_{1,2,3}$	IS2473D
$fD_{4,5,6}$	IN-60
$fDZ_{1,2}$	05Z8.2Z
$fIC_{1,2}$	MB74LS09
fIC_3	MB8841-566M
$fIC_{4,5}$	MSM4049RS, MB84049B
fIC_6	MB84066B, MSM4066RS
fIC_7	NJM4556
$fIC_{8,10}$	NJM2902N, MB84081B
fIC_9	MJM29040, μPC358C
fIC_{11}	MB84081RS, MB84081B
fIC_{12}	MSM4538RS, TC4538BP

S-0111

$fLD_{1\sim3}$	LN25RCP

S-0112

$fQ_{5\sim7}$	PN150

S-0113

$fQ_{8,9}$	PS4010-L

hQ_1	2SD600(E,F) 2SD794(Q,P)
hQ_2	2SB631(E,F) 2SB744(Q,P)
hIC_1	M5230L
hIC_2	μPC78M05H
$hD_{1,2}$	RB152

SYMBOL

△	Ceramic
●	Mylar
⊠	Styrol
⊗	Tantalum Electrolytic
▣	Aluminum Electrolytic
◒	Low-Leak Electrolytic
(B.P)	Bi-Polar Electrolytic
(P.P)	Polypropylene Film
●	Polycarbonate Film
(L.B)	Low-Leak Bi-Polar Electrolytic
⊘	Fusing Resistor
⊡	Non-Inflammable Resistor
■	Metal Film Resistor
□	Cement Resistor
◩	Non-Inductive Cement Resistor

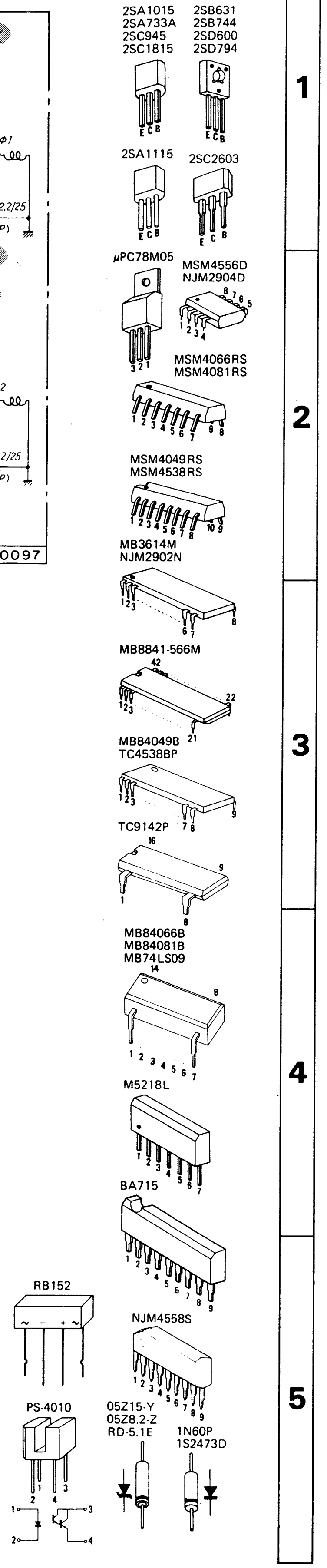
RESISTERS
Are in ohms, ¼ Watts, ±5% Tolerance
Unless Otherwise Noted, K:kΩ, M:MΩ

CAPACITORS
Are in μF, Unless Otherwise Noted. P:pF

TOLERANCE
J: ±5%, G: ±2%, F: ±1%

Each D.C. Voltage measured by the instruments discribed below shows the nominal value in volts at 33⅓rpm.
Measuring instruments
Volt Meter
Osciloscope
Electrolytic Capacitor
: Capacitance [μF]/Volt [V]

SYMBOL OF FUNCTION
(e) MO. CONTROL
(f) T.A. CONTROL
(g) INDICATOR
(h) POWER SUPLLY


2SA1015
2SA733A
2SC945
2SC1815
2SB631
2SB744
2SD600
2SD794
E C B
2SA1115
2SC2603
μPC78M05
MSM4556D
NJM2904D
MSM4066RS
MSM4081RS
MSM4049RS
MSM4538RS
MB3614M
NJM2902N
MB8841-566M
MB84049B
TC4538BP
TC9142P
MB84066B
MB84081B
MB74LS09
M5218L
BA715
RB152
NJM4558S
PS-4010
05Z15-Y
05Z8.2-Z
RD-5.1E
1N60P
1S2473D

8. MAIN PARTS REPLACEMENT

8-1. Replacement of Tone Arm Horizontally Driving Wire (See Fig. 3-4 on Page 6, Top View on Page 8)

1) Remove the cabinet. (See How to remove the cabinet on Page 7)
2) Remove the mecha guide.
3) Loosen the tension adjusting screw.
4) Remove the pully (B).
5) Take off the screw Ⓐ fixing the driving wire under the mechanism chassis.

8-2. Replacement of Arm Bearing Ass'y (52)

(See of Exploded View of Mechanism Ass'y on Page 9, 10)

1) Perform items 1), 2), 3) "8-1. Replacement of Tone Arm Horizontally Driving Wire" first.
2) Loosen the hexagon socket head screw (56) to remove the tone arm ass'y (51).
3) Loosen the nut (55), the pivot (54) to remove the arm holder weight (53).
4) Loosen the nut ㉖ to remove the arm bearing ass'y.

8-3. Replacement of Lifter Cam ⑪

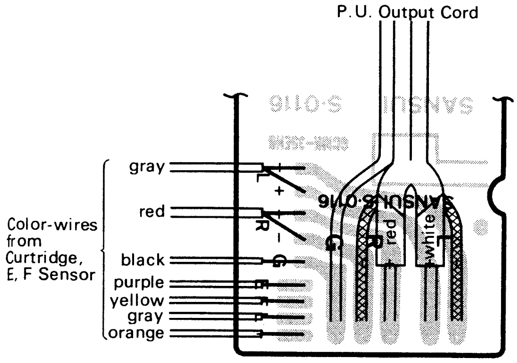
(See Exploded View of Mechanism Ass'y on Page 9, 10)

1) Perform items 1), 2), 3) "8-1. Replacement of Tone Arm Horizontally Driving Wire" first.
2) Perform items 2), 3) "8-2. Replacement of Lifter Cam"
3) Remove the arm holder weight (53).
4) Remove the E-type washer ⑭, plane washer ⑬, spring ⑮.
5) Remove the lifter plate ⑪.
6) The lifter cam can be taken out.

8-4. Note on Parts Replacement

1) When replacing a parts of the mechanism ass'y, remove the stylus.
2) When replacing the worm shaft ass'y (B)⑥, remove the worm shaft guide⑤, the screw⑦.
3) Refear to Fig. 8-1, when wiring from cartridge (tone arm ass'y (51)).
4) When replacing a parts of the mechanism ass'y, make proper wirings referring to the top view on page 8 and Fig. 3-4 on page 6.
5) Perform adjustment 3-1, 3-2 and 3-3, when replacing a parts of the mechanism ass'y.

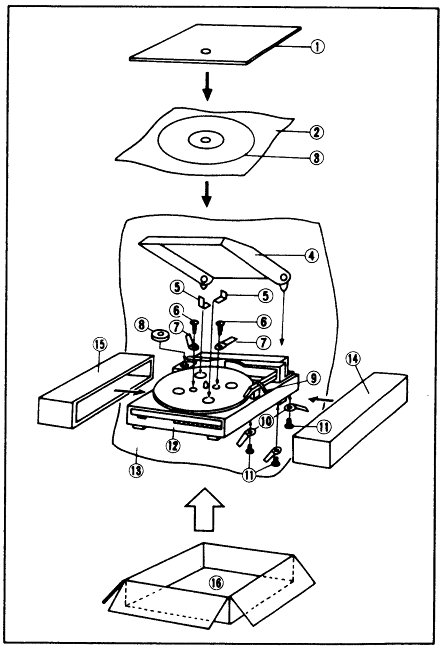
Fig. 8-1. S-0116 Circuit Board for connections between P.U. Output cord & color wires from cartridge, E sensor and F sensor.



9. PACKING LIST

Parts No.	Stock No.	Description
1	———	Corrugated Board
2	91165200	Polyethylene Bag
3	13099110	Turntable Sheet
4	13112000	Dust Cover
5	———	Styrofoam Spacer
6	———	Special Tapping Screw
7	———	Tag Washer
8	13012300	EP Adaptor
9	———	Binder
10	———	Tag Washer
11	00428700	Binding Head Screw, M4 x 14
12	———	Turntable Unit
13	91122710	Polyethylene Bag
14	13108200	Inner Packing (Right)
15	13108300	Inner Packing (Left)
16	13102800	Carton Case

Note: Parts without Stock Nos. are not supplied even parts name are listed in the parts list.



10. ACCESSORY LIST

Stock No.	Description
46142800	Operating Instruction